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NOTES ON GEOGRAPHIC DISTRIBUTION

# New distribution reports of *Rhagomys rufescens* (Rodentia: Sigmodontinae) Thomas, 1886

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**ABSTRACT:** *Rhagomys rufescens* is a rare, arboreal sigmodontine rodent endemic to the Brazilian Atlantic Forest biome. This species is known from eight localities in Brazil. Here we present a new report based on four individuals of this species registered in Serra do Ouro Branco, municipality of Ouro Branco (Minas Gerais, Brazil). One juvenile male, one adult male and two juvenile females were captured in pitfall traps during the rainy season, in a study of small mammal ecology. This is the first record for the Espinhaço Mountain range and the northernmost report for the species in this state, 85 km northeast of the last registered location.

*Rhagomys rufescens* (Thomas, 1886) is an enigmatic arboreal sigmodontine rodent classified at the suprageneric level as "*incertae sedis*" (Reig 1980; 1984; McKenna and Bell 1997; Smith and Patton 1999; Musser and Carleton 2005). This species was considered a "plesiomorphic Neotropical muroid", according to Voss (1993) and Steppan (1995). Although there is no consensus on its tribal position (Percequillo *et al.* 2004), some authors include *Rhagomys* in the tribe Thomasomyini, based on morphological characters (Pacheco 2003) or nuclear IRBP gene sequences (D'Elia *et al.* 2006; 2007). However, Testoni *et al.* (2010) were unable to determine the relationship between this species and others belonging to the Thomasomyini tribe using cytogenetic analyses.

*Rhagomys rufescens* is endemic to the eastern Brazilian Atlantic Forest morphoclimatic domain, being present in the states of Santa Catarina, São Paulo, Rio de Janeiro, Minas Gerais and Espírito Santo, and poorly represented in scientific collections and surveys (Steiner-Souza *et al.* 2008). Recently, Percequillo *et al.* (2011) found four molars of *Rhagomys* sp. in a single ocelot (*Leopardus pardalis*) scat sample from the municipality of Alta Floresta, state of Mato Grosso, Brazil. This specimen could be of the species *R. rufescens* but the authors were unable to confirm the identification.

*Rhagomys rufescens* was considered critically threatened by the IUCN in 1996, after 100 years without collecting reports, and it is currently regarded as near threatened (Geise *et al.* 2008). Information on geographic distribution is scarce and represented by about one or two individuals in each place, except for the municipality of Indaial, Santa Catarina, where 10 individuals were reported in an extensive work searching for this species (Steiner-Souza *et al.* 2008).

In this paper, we report the occurence of *R. rufescens* at the Serra do Ouro Branco, municipality of Ouro Branco, southeast Minas Gerais State, Brazil (Figure 1). This region is located in a transition between Cerrado and Atlantic Forest domain, at the south of the Espinhaço mountain range. Our report occurred in an area of vegetation characterized as semi-deciduous mountain forest. A portion of the sampled locality is now inside a conservation area, the State Park of Serra do Ouro Branco.

This is the first record of this species in the Espinhaço mountain range, and the fourth and northernmost report for the species in the state of Minas Gerais. It is located about 85 km northeast of the last registered location in the Estação de Pesquisa, Treinamento e Educação Ambiental Mata do Paraíso (EPTEA Mata do Paraíso), in the municipality of Viçosa (Percequillo *et al.* 2004). The other known report for Minas Gerais is in the municipality of Poços de Caldas (Percequillo *et al.* 2004) and Parque Estadual Serra do Papagaio, municipality of Baependi (Passamani *et al.* 2011).

We carried a long term study on small mammals of the Serra do Ouro Branco from December 2006 to December 2010. In this study we used pitfall traps with drift fences, composed of buckets of 60L. The sampling was conducted for four nights per month. The traps were organized in two different ways along the study time.

From December 2006 to December 2009, the field work was conducted in one locality using three linear transects of 10 buckets each, perfoming 4440 traps / night. The transects were installed in three different habitats and distanced at least 500 m from each other. One of these habitats corresponded to the forest interior, another to an edge of the forest fragment near a cornfield, and the last one, to an edge near an area with a particular physiognomy of the brazilian savanna biome, known as "*campo rupestre*".

From January to December 2010, we sampled two other localities within the same forest spot. In each of these we placed three transects, one in the interior of the forest fragment, another at an edge near the road and the last one at an edge near a cornfield. Thus, the edge near a "*campo rupestre*" physiognomy was excluded in this

second phase. All sampled localities distanced at least 1.5 km from each other. In this period we also changed the conformation of the pitfall traps from linear to Y-shaped transects. Each Y-shaped transect was composed of four buckets, one at each end, and one at the juncture of the Y. These transects were always installed in sets of three in each sampled habitat. This second phase of the study totaled 5184 traps/night, corresponding to 1728 in each locality, and 576 in each habitat type.

The collects were authorized by IBAMA NUFAS license under the number 482/06 and ICMBIO 21543-1. The animals were deposited in the Mammal Collection of the Laboratory of Vertebrate Zoology of the Universidade Federal de Ouro Preto (LZV-UFOP), with accession numbers 163R, 213R, 214R and 215R.

*Rhagomys rufescens* was captured only in two localities, and always in the interior of the forest fragment, over 40 m away from the nearest edge. These two localities were approximately 2.5 km distant to each other. In one of these localities, the canopy reaches 25 meters in height and the traps were located within ten meters of a stream (20°29'43 .16" S, 43°36'26.71" W, 1069 masl). In the other locality, there was no water source nearby and the canopy was lower, with 18 meters on average (20°29'46.36" S and 43°37'23.97" W, 935 masl). This report of *R. rufescens* corroborates the pattern predicted by Steiner-Souza *et al.* (2008), in which this species seems to occur at altitudes above 500m, in transitional vegetation zones of montane forests.

**Table 1.** Body and cranial morphometric measurements, in millimeters, for the four individuals of *Rhagomys rufescens* collected in Serra do Ouro Branco, Minas Gerais, Brazil. The age class follows Voss (1991) and cranial measurements follow Pardiñas *et al.* (2009).

| | 163R | 213 R | 214R | 215R |
|---|---|---|---|---|
| Sex | F | M | F | M |
| Head and body length | 85 | 83 | 82 | 98 |
| Tail | 85 | 86 | 88 | 107 |
| Hind Foot | 18 | 20 | 19 | 22 |
| Ear length | 10 | 13 | 13 | 15 |
| Age class | 1 | 2 | 2 | 4 |
| Condylobasal length | 24.25 | 24.85 | 24.89 | 27.89 |
| Occipital condyle width | 5.93 | 5.96 | 6.09 | 6.27 |
| Diastema | 6.18 | 6.49 | 6.5 | 7.79 |
| Palatal Bridge | 5.52 | 5.85 | 5.75 | 6.62 |
| Incisive foramina length | 3.6 | 3.92 | 3.29 | 4.2 |
| Incisive foramina width | 1.55 | 1.5 | 1.42 | 1.46 |
| Upper molar row length | 4.45 | 4.46 | 4.43 | 4.82 |
| M1 breadth | 1.69 | 1.3 | 1.39 | 1.32 |
| Breadth between M1 | 4.81 | 4.91 | 4.85 | 5.09 |
| Bullar length less tube | 3.77 | 3.79 | 3.72 | 3.72 |
| Cranial height | 8.69 | 9.02 | 8.72 | 9.22 |
| Rostral length | 8.35 | 8.54 | 8.38 | 10.14 |
| Rostral width | 3.65 | 4.45 | 3.68 | 4.11 |
| Least interorbital breadth | 4.86 | 4.97 | 5 | 5.06 |
| Internal orbital length | 9.34 | 9.89 | 9.92 | 10.49 |
| Zygomatic breadth | 12.96 | 14.08 | 13.81 | 15.49 |
| Braincase width | 12.83 | 13.1 | 13.22 | 13.33 |
| Zygomatic plate width | 3.31 | 3.13 | 3.5 | 3.58 |
| Mandible height | 6.05 | 6.18 | 6.18 | 7.55 |
| Mandible length | 12.97 | 13.49 | 13.4 | 15.34 |

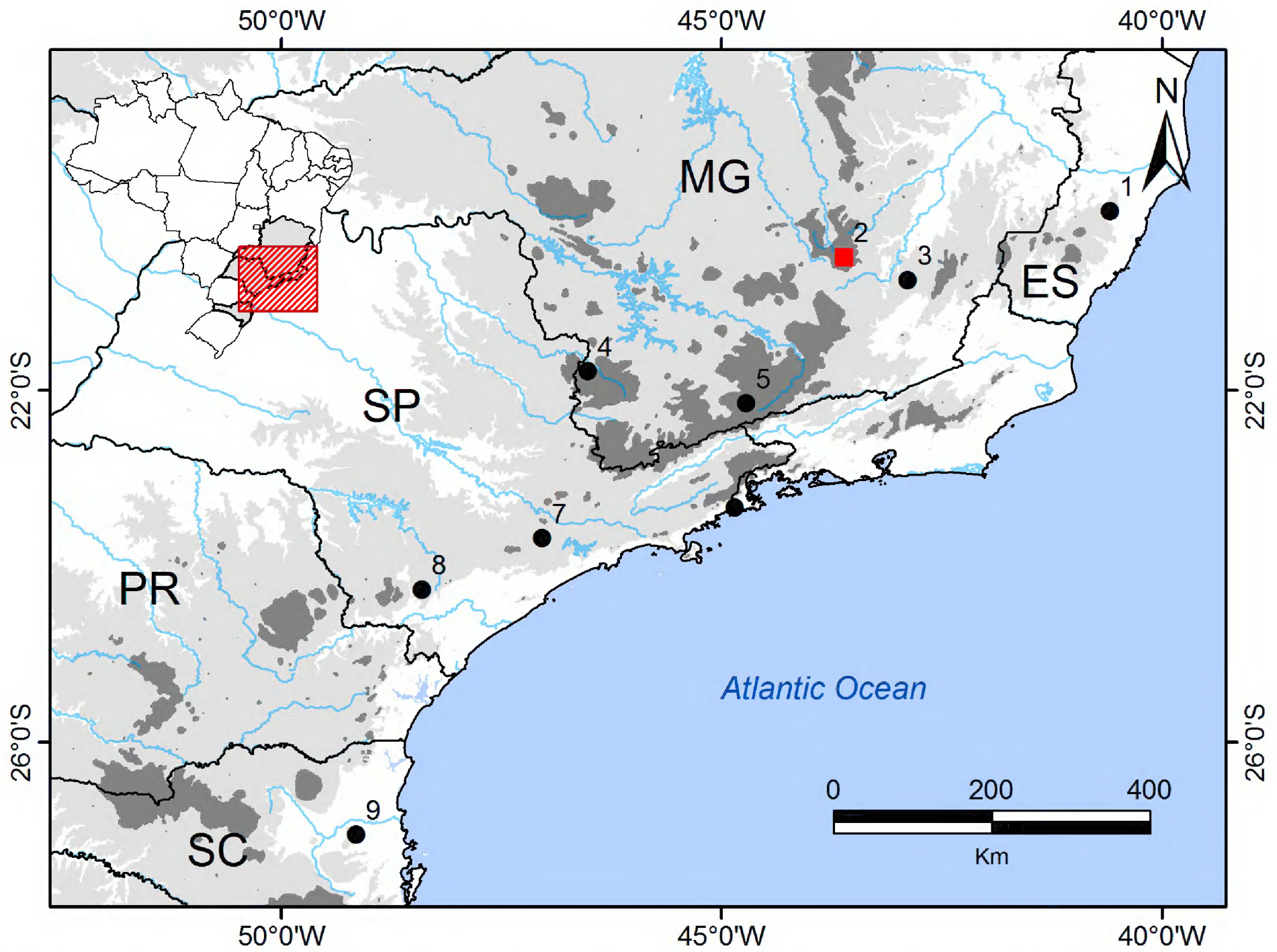


**Figure 1.** Distribution records of *Rhagomys rufescens* showing in red the locality for the new records presented here. 1- Santa Tereza (ES), 2- New record, Serra do Ouro Branco (MG) 3- EPTEA Mata do Paraíso (MG), 4- Poços de Caldas (MG), 5- Baependi (MG) 6- Ubatuba (SP), 7- Caucaia do Alto, 8- Ribeirão Grande (SP), 9- Indaial (SC).

We captured one juvenile male in October 2010, one adult male in September 2010 and two juvenile females in February and December 2007. The morphometric data of these specimens followed Pardiñas (2008) and the age classes followed Voss (1991); they are shown in Table 1. The cranial measures seem to agree with the description of Percequillo *et al.* (2004), but our sample size and the high proportion of juveniles hindered us from making statistic analyses.

All captures of *R. rufescens* occurred on nights of heavy rain, with the animals being drowned in the water accumulated inside the buckets. The buckets were provided with a piece of Styrofoam in order to help the animals float, which unfortunately was not effective for this species. Umetsu *et al.* (2006) observed that the efficiency of the capture of rodents using pitfalls increases with precipitation. This seems to be true for *R. rufenscens*. In our study, the rain may have acted by stunning the animals, thereby allowing them to fall into the bucket full of water, and making it impossible to escape by jumping out of it.

Steiner-Souza *et al.* (2008) raise the question of whether *R. rufescens* is really a rare species or it is sub-sampled due to the type of trap used. The authors believe that pitfall traps are more efficient at capturing this species, because almost all specimens known were captured this way. However, in our four years of work, with a total effort of 9624 traps /night, only four individuals were collected, which leads us to believe that the species is really rare. If pitfall traps are the best kind to collect this species, maybe the buckets must be bigger to prevent them from escaping, because the specimens were captured only when the buckets were full of water. Thus, adults may have the ability to jump out of a 50 cm high bucket, which would be more difficult for young individuals, which correspond to the majority of the specimens captured in this study.

These records in a protection area are very important to *R. rufescens* conservation. Currently there are only three records of this species for Minas Gerais, and one of them, in Poços de Caldas, corresponds to an area under great impact due to bauxite mining (Percequillo *et al.* 2004). More studies need to be made in montane forests aimed at finding new populations of *R. rufescens* in Minas Gerais, so we can monitor it and better understand the requirements and particularities of this species.

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